checked by RI
11/20/15

MEMORANDUM

TO: Mr. Addison Rice
Anderson, Mulholland and Associates

DATE: November 14, 2015

FROM: R. Infante

FILE: 1510593

RE: Data Validation
Air samples
SDG: 1510593

SUMMARY

Full validation was performed on the data for several gas samples analyzed for volatile organic compounds (full suite) by method Compendium Method TO-15: Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999. The samples were collected at the Building 6 VI, Bristol Myer Squib, Humacao, PR site on October 27-28, 2010 and submitted to Eurofins Air Toxics, Inc. of Folson, California that analyzed and reported the results under delivery groups (SDG) 1510593.

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: Compendium Method TO-15. Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999; Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

In general the data is valid as reported and may be used for decision making purposes. The data results are acceptable for use. Results for ethanol and 2-propanol qualified as estimated (J) in samples 151093-04A and 151093-05A due to RPD over laboratory and generally acceptable control limits for field duplicates.

SAMPLES

The samples included in the review are listed below

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B30SSV-1102715	1510593-01A	10/27/2015	Air	VOCs
B30SSV-2102715	1510593-02A	10/27/2015	Air	VOCs
B30SSV-3102815	1510593-03A	10/28/2015	Air	VOCs
B30SSV-4102715	1510593-04A	10/27/2015	Air	VOCs
B30SSV-4D102715	1510593-05A	10/27/2015	Air	VOCs

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
06A B42SSV-1102815	1510593-06A	10/28/15	Air	VOCs
07A B42SSV-2102815	1510593-07A	10/28/15	Air	VOCs
08A B42SSV-3102815	1510593-06A	10/28/15	Air	VOCs

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Canister cleaning certification criteria
- Surrogate spike recovery
- Internal standard performance and retention times
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

Holding Times and Sample Preservation

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

GC/MS Tunes

The frequency and abundance of bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within the tuning criteria associated with the method.

Initial and Continuing Calibrations

VOCs – (Method TO-15)
Initial calibration meets method performance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard, continuing calibration meet the method performance criteria.

Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks except for the following:

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
11/03/15	1510593-09A	Air/low	Acetone	0.82 ppbv
			CS_2	0.43 ppbv
			4-methyl-2-pentanone	0.15 ppbv
			1,3,5-trimethylbenzene	0.19 ppbv
			1,2,4-trichlorobenzene	0.084 ppbv

Note: no action taken; analyte concentrations below the action level for blanks.

Summa canister met cleaning certification criteria.

No trip/field blank analyzed with this data package.

Surrogate Spike Recovery

The surrogate recoveries as per method TO-15 were within the laboratory QC acceptance limits in all samples analyzed.

Internal Standard Performance

VOCs -
Samples were spiked with the method specified internal standard. Internal standard are performance and retention times met the QC acceptance criteria in all sample analyses and calibration standards.

Laboratory/Field Duplicate Results

Field/laboratory duplicates were analyzed as part of this data set. Target analytes meet the RPD performance criteria of + 25 % for analytes 5 x SQL except for the followings:

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Ethanol	4.8	99	35	96 %	Qualify results (J) in affected samples.
2-propanol	4.8	21	120	140 %	Qualify results (J) in affected samples.

LCS/LCSD Results

LCS/LCSD (blank spike) analyzed by the laboratory associated with this data package; % recoveries and RPD within laboratory and generally acceptable control limits except for the followings:

LCS ID	COMPOUND	% R	QC LIMIT
_1510593-11B_____	Naphthalene_____	50_%	60_-_140__
_1510593-11BB_____	Naphthalene_____	58_%	60_-_140__
_1510593-11BB_____	Methy-tert-butyl-ether_____	69_%	70_-_130__

Note: no action taken; professional judgment.

Quantitation Limits and Sample Results

Dilutions were performed on TO-15 samples (see worksheet).

Calculations were spot checked.

Certification

The following samples 1510593-01A; 1510593-02A; 1510593-03A; 1510593-04A; 1510593-05A; 1510593-06A; 1510593-07A; and 1510593-08A were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. The results are valid.

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Client Sample ID: B30SSV-1102715

Lab ID#: 1510593-01A

EPA METHOD TO-15 GC/MS

File Name:	**14110306**	**Date of Collection:**	**10/27/15 6:01:00 PM**
Dil. Factor:	**233**	**Date of Analysis:**	**11/3/15 11:55 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1200	Not Detected	5800	Not Detected
Freon 114	1200	Not Detected	8100	Not Detected
Chloromethane	4700	Not Detected	9600	Not Detected
Vinyl Chloride	1200	Not Detected	3000	Not Detected
1,3-Butadiene	1200	Not Detected	2600	Not Detected
Bromomethane	1200	Not Detected	4500	Not Detected
Chloroethane	4700	Not Detected	12000	Not Detected
Freon 11	1200	Not Detected	6500	Not Detected
Ethanol	4700	Not Detected	8800	Not Detected
Freon 113	1200	Not Detected	8900	Not Detected
1,1-Dichloroethene	1200	Not Detected	4600	Not Detected
Acetone	4700	Not Detected	11000	Not Detected
2-Propanol	4700	Not Detected	11000	Not Detected
Carbon Disulfide	1200	Not Detected	3600	Not Detected
3-Chloropropene	4700	Not Detected	14000	Not Detected
Methylene Chloride	1200	Not Detected	4000	Not Detected
Methyl tert-butyl ether	1200	Not Detected	4200	Not Detected
trans-1,2-Dichloroethene	1200	Not Detected	4600	Not Detected
Hexane	1200	600 J	4100	2100 J
1,1-Dichloroethane	1200	Not Detected	4700	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4700	Not Detected	14000	Not Detected
cis-1,2-Dichloroethene	1200	Not Detected	4600	Not Detected
Tetrahydrofuran	1200	Not Detected	3400	Not Detected
Chloroform	1200	Not Detected	5700	Not Detected
1,1,1-Trichloroethane	1200	Not Detected	6400	Not Detected
Cyclohexane	1200	640 J	4000	2200 J
Carbon Tetrachloride	1200	Not Detected	7300	Not Detected
2,2,4-Trimethylpentane	1200	Not Detected	5400	Not Detected
Benzene	1200	540 J	3700	1700 J
1,2-Dichloroethane	1200	Not Detected	4700	Not Detected
Heptane	1200	Not Detected	4800	Not Detected
Trichloroethene	1200	Not Detected	6300	Not Detected
1,2-Dichloropropane	1200	Not Detected	5400	Not Detected
1,4-Dioxane	4700	Not Detected	17000	Not Detected
Bromodichloromethane	1200	Not Detected	7800	Not Detected
cis-1,3-Dichloropropene	1200	Not Detected	5300	Not Detected
4-Methyl-2-pentanone	1200	Not Detected	4800	Not Detected
Toluene	1200	Not Detected	4400	Not Detected
trans-1,3-Dichloropropene	1200	Not Detected	5300	Not Detected
1,1,2-Trichloroethane	1200	Not Detected	6400	Not Detected
Tetrachloroethene	1200	Not Detected	7900	Not Detected
2-Hexanone	4700	Not Detected	19000	Not Detected

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Client Sample ID: B30SSV-1102715

Lab ID#: 1510593-01A

EPA METHOD TO-15 GC/MS

File Name:	**14110306**	**Date of Collection:**	**10/27/15 6:01:00 PM**
Dil. Factor:	**233**	**Date of Analysis:**	**11/3/15 11:55 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1200	Not Detected	9900	Not Detected
1,2-Dibromoethane (EDB)	1200	Not Detected	9000	Not Detected
Chlorobenzene	1200	Not Detected	5400	Not Detected
Ethyl Benzene	1200	64000	5000	280000
m,p-Xylene	1200	700000	5000	3000000
o-Xylene	1200	14000	5000	59000
Styrene	1200	Not Detected	5000	Not Detected
Bromoform	1200	Not Detected	12000	Not Detected
Cumene	1200	260 J	5700	1300 J
1,1,2,2-Tetrachloroethane	1200	Not Detected	8000	Not Detected
Propylbenzene	1200	Not Detected	5700	Not Detected
4-Ethyltoluene	1200	Not Detected	5700	Not Detected
1,3,5-Trimethylbenzene	1200	Not Detected	5700	Not Detected
1,2,4-Trimethylbenzene	1200	Not Detected	5700	Not Detected
1,3-Dichlorobenzene	1200	Not Detected	7000	Not Detected
1,4-Dichlorobenzene	1200	Not Detected	7000	Not Detected
alpha-Chlorotoluene	1200	Not Detected	6000	Not Detected
1,2-Dichlorobenzene	1200	Not Detected	7000	Not Detected
1,2,4-Trichlorobenzene	4700	Not Detected	34000	Not Detected
Hexachlorobutadiene	4700	Not Detected	50000	Not Detected
Naphthalene	4700	Not Detected	24000	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: B30SSV-2102715

Lab ID#: 1510593-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110227**	**Date of Collection:**	**10/27/15 3:53:00 PM**
Dil. Factor:	**9.16**	**Date of Analysis:**	**11/3/15 01:08 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.6	Not Detected	23	Not Detected
Freon 114	4.6	Not Detected	32	Not Detected
Chloromethane	46	Not Detected	94	Not Detected
Vinyl Chloride	4.6	Not Detected	12	Not Detected
1,3-Butadiene	4.6	Not Detected	10	Not Detected
Bromomethane	46	Not Detected	180	Not Detected
Chloroethane	18	Not Detected	48	Not Detected
Freon 11	4.6	Not Detected	26	Not Detected
Ethanol	18	40	34	75
Freon 113	4.6	Not Detected	35	Not Detected
1,1-Dichloroethene	4.6	Not Detected	18	Not Detected
Acetone	46	19 J	110	46 J
2-Propanol	18	9.8 J	45	24 J
Carbon Disulfide	18	2.8 J	57	8.6 J
3-Chloropropene	18	Not Detected	57	Not Detected
Methylene Chloride	46	Not Detected	160	Not Detected
Methyl tert-butyl ether	4.6	1.2 J	16	4.4 J
trans-1,2-Dichloroethene	4.6	Not Detected	18	Not Detected
Hexane	4.6	18	16	64
1,1-Dichloroethane	4.6	Not Detected	18	Not Detected
2-Butanone (Methyl Ethyl Ketone)	18	3.5 J	54	10 J
cis-1,2-Dichloroethene	4.6	2.2 J	18	8.8 J
Tetrahydrofuran	4.6	Not Detected	14	Not Detected
Chloroform	4.6	Not Detected	22	Not Detected
1,1,1-Trichloroethane	4.6	Not Detected	25	Not Detected
Cyclohexane	4.6	Not Detected	16	Not Detected
Carbon Tetrachloride	4.6	Not Detected	29	Not Detected
2,2,4-Trimethylpentane	4.6	26	21	120
Benzene	4.6	60	15	190
1,2-Dichloroethane	4.6	Not Detected	18	Not Detected
Heptane	4.6	4.2 J	19	17 J
Trichloroethene	4.6	1.4 J	25	7.7 J
1,2-Dichloropropane	4.6	Not Detected	21	Not Detected
1,4-Dioxane	18	Not Detected	66	Not Detected
Bromodichloromethane	4.6	Not Detected	31	Not Detected
cis-1,3-Dichloropropene	4.6	Not Detected	21	Not Detected
4-Methyl-2-pentanone	4.6	1.6 J	19	6.7 J
Toluene	4.6	2.4 J	17	9.1 J
trans-1,3-Dichloropropene	4.6	Not Detected	21	Not Detected
1,1,2-Trichloroethane	4.6	Not Detected	25	Not Detected
Tetrachloroethene	4.6	Not Detected	31	Not Detected
2-Hexanone	18	Not Detected	75	Not Detected

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Client Sample ID: B30SSV-2102715

Lab ID#: 1510593-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110227**	**Date of Collection:**	**10/27/15 3:53:00 PM**
Dil. Factor:	**9.16**	**Date of Analysis:**	**11/3/15 01:08 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4.6	Not Detected	39	Not Detected
1,2-Dibromoethane (EDB)	4.6	Not Detected	35	Not Detected
Chlorobenzene	4.6	2.8 J	21	13 J
Ethyl Benzene	4.6	3.2 J	20	14 J
m,p-Xylene	4.6	8.6	20	37
o-Xylene	4.6	3.0 J	20	13 J
Styrene	4.6	Not Detected	20	Not Detected
Bromoform	4.6	Not Detected	47	Not Detected
Cumene	4.6	1.4 J	22	7.1 J
1,1,2,2-Tetrachloroethane	4.6	Not Detected	31	Not Detected
Propylbenzene	4.6	Not Detected	22	Not Detected
4-Ethyltoluene	4.6	Not Detected	22	Not Detected
1,3,5-Trimethylbenzene	4.6	Not Detected	22	Not Detected
1,2,4-Trimethylbenzene	4.6	Not Detected	22	Not Detected
1,3-Dichlorobenzene	4.6	Not Detected	28	Not Detected
1,4-Dichlorobenzene	4.6	Not Detected	28	Not Detected
alpha-Chlorotoluene	4.6	Not Detected	24	Not Detected
1,2-Dichlorobenzene	4.6	Not Detected	28	Not Detected
1,2,4-Trichlorobenzene	18	Not Detected	140	Not Detected
Hexachlorobutadiene	18	Not Detected	200	Not Detected
Naphthalene	9.2	Not Detected	48	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: B30SSV-3102815

Lab ID#: 1510593-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3110219	**Date of Collection:** 10/28/15 12:31:00 P
Dil. Factor:	2.38	**Date of Analysis:** 11/2/15 09:42 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.37 J	5.9	1.8 J
Freon 114	1.2	Not Detected	8.3	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	12	Not Detected	46	Not Detected
Chloroethane	4.8	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.7	Not Detected
Ethanol	4.8	23	9.0	43
Freon 113	1.2	0.21 J	9.1	1.6 J
1,1-Dichloroethene	1.2	Not Detected	4.7	Not Detected
Acetone	12	24	28	57
2-Propanol	4.8	9.6	12	24
Carbon Disulfide	4.8	0.70 J	15	2.2 J
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	1.3 J	41	4.5 J
Methyl tert-butyl ether	1.2	0.22 J	4.3	0.80 J
trans-1,2-Dichloroethene	1.2	Not Detected	4.7	Not Detected
Hexane	1.2	0.98 J	4.2	3.4 J
1,1-Dichloroethane	1.2	Not Detected	4.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	6.0	14	18
cis-1,2-Dichloroethene	1.2	Not Detected	4.7	Not Detected
Tetrahydrofuran	1.2	0.98 J	3.5	2.9 J
Chloroform	1.2	Not Detected	5.8	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Cyclohexane	1.2	6.0	4.1	21
Carbon Tetrachloride	1.2	Not Detected	7.5	Not Detected
2,2,4-Trimethylpentane	1.2	0.68 J	5.6	3.2 J
Benzene	1.2	1.4	3.8	4.3
1,2-Dichloroethane	1.2	Not Detected	4.8	Not Detected
Heptane	1.2	0.96 J	4.9	3.9 J
Trichloroethene	1.2	0.43 J	6.4	2.3 J
1,2-Dichloropropane	1.2	Not Detected	5.5	Not Detected
1,4-Dioxane	4.8	0.94 J	17	3.4 J
Bromodichloromethane	1.2	Not Detected	8.0	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
4-Methyl-2-pentanone	1.2	0.98 J	4.9	4.0 J
Toluene	1.2	0.96 J	4.5	3.6 J
trans-1,3-Dichloropropene	1.2	Not Detected	5.4	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.5	Not Detected
Tetrachloroethene	1.2	0.48 J	8.1	3.2 J
2-Hexanone	4.8	2.7 J	19	11 J

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Client Sample ID: B30SSV-3102815

Lab ID#: 1510593-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110219**	**Date of Collection:**	**10/28/15 12:31:00 P**
Dil. Factor:	**2.38**	**Date of Analysis:**	**11/2/15 09:42 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.1	Not Detected
Chlorobenzene	1.2	Not Detected	5.5	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	0.79 J	5.2	3.4 J
o-Xylene	1.2	0.36 J	5.2	1.6 J
Styrene	1.2	Not Detected	5.1	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.8	Not Detected
1,1,2,2-Tetrachloroethane	1.2	0.25 J	8.2	1.7 J
Propylbenzene	1.2	Not Detected	5.8	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.8	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.8	Not Detected
1,2,4-Trimethylbenzene	1.2	0.31 J	5.8	1.5 J
1,3-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.2	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.2	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	35	Not Detected
Hexachlorobutadiene	4.8	Not Detected	51	Not Detected
Naphthalene	2.4	0.12 J	12	0.62 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	113	70-130
1,2-Dichloroethane-d4	124	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: B30SSV-4102715

Lab ID#: 1510593-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110216**	**Date of Collection:**	**10/27/15 4:36:00 PM**
Dil. Factor:	**2.28**	**Date of Analysis:**	**11/2/15 07:51 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.73 J	5.6	3.6 J
Freon 114	1.1	Not Detected	8.0	Not Detected
Chloromethane	11	Not Detected	24	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	11	Not Detected	44	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.1	0.70 J	6.4	3.9 J
Ethanol	4.6	99 J	8.6	190
Freon 113	1.1	0.24 J	8.7	1.8 J
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	21	27	50
2-Propanol	4.6	21 J	11	52
Carbon Disulfide	4.6	3.0 J	14	9.3 J
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	11	0.79 J	40	2.8 J
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	0.57 J	4.0	2.0 J
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	3.8 J	13	11 J
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	0.36 J	3.4	1.1 J
Chloroform	1.1	Not Detected	5.6	Not Detected
1,1,1-Trichloroethane	1.1	0.31 J	6.2	1.7 J
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.2	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.3	Not Detected
Benzene	1.1	0.57 J	3.6	1.8 J
1,2-Dichloroethane	1.1	Not Detected	4.6	Not Detected
Heptane	1.1	0.48 J	4.7	2.0 J
Trichloroethene	1.1	Not Detected	6.1	Not Detected
1,2-Dichloropropane	1.1	Not Detected	5.3	Not Detected
1,4-Dioxane	4.6	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.1	0.27 J	4.7	1.1 J
Toluene	1.1	0.56 J	4.3	2.1 J
trans-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	0.78 J	7.7	5.3 J
2-Hexanone	4.6	0.71 J	19	2.9 J

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Client Sample ID: B30SSV-4102715

Lab ID#: 1510593-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110216**	**Date of Collection:**	**10/27/15 4:36:00 PM**
Dil. Factor:	**2.28**	**Date of Analysis:**	**11/2/15 07:51 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.7	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.8	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	Not Detected	4.9	Not Detected
m,p-Xylene	1.1	0.56 J	5.0	2.4 J
o-Xylene	1.1	Not Detected	5.0	Not Detected
Styrene	1.1	Not Detected	4.8	Not Detected
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	0.33 J	5.6	1.6 J
1,3-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.9	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected
Naphthalene	2.3	0.069 J	12	0.36 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: B30SSV-4D102715

Lab ID#: 1510593-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110217**	**Date of Collection:**	**10/27/15 4:35:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**11/2/15 08:18 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.90 J	6.0	4.4 J
Freon 114	1.2	Not Detected	8.4	Not Detected
Chloromethane	12	1.2 J	25	2.6 J
Vinyl Chloride	1.2	Not Detected	3.1	Not Detected
1,3-Butadiene	1.2	Not Detected	2.7	Not Detected
Bromomethane	12	Not Detected	47	Not Detected
Chloroethane	4.8	Not Detected	13	Not Detected
Freon 11	1.2	0.50 J	6.8	2.8 J
Ethanol	4.8	35 J	9.1	65
Freon 113	1.2	Not Detected	9.3	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Acetone	12	21	29	49
2-Propanol	4.8	120 J	12	300
Carbon Disulfide	4.8	0.54 J	15	1.7 J
3-Chloropropene	4.8	Not Detected	15	Not Detected
Methylene Chloride	12	1.3 J	42	4.5 J
Methyl tert-butyl ether	1.2	Not Detected	4.4	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Hexane	1.2	Not Detected	4.3	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.8	3.0 J	14	8.8 J
cis-1,2-Dichloroethene	1.2	Not Detected	4.8	Not Detected
Tetrahydrofuran	1.2	0.28 J	3.6	0.83 J
Chloroform	1.2	Not Detected	5.9	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Cyclohexane	1.2	Not Detected	4.2	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.6	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.6	Not Detected
Benzene	1.2	Not Detected	3.9	Not Detected
1,2-Dichloroethane	1.2	Not Detected	4.9	Not Detected
Heptane	1.2	Not Detected	5.0	Not Detected
Trichloroethene	1.2	Not Detected	6.5	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.6	Not Detected
1,4-Dioxane	4.8	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	8.1	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
4-Methyl-2-pentanone	1.2	0.55 J	5.0	2.2 J
Toluene	1.2	0.44 J	4.6	1.6 J
trans-1,3-Dichloropropene	1.2	Not Detected	5.5	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.6	Not Detected
Tetrachloroethene	1.2	0.45 J	8.2	3.1 J
2-Hexanone	4.8	0.49 J	20	2.0 J

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Client Sample ID: B30SSV-4D102715

Lab ID#: 1510593-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110217**	**Date of Collection:**	**10/27/15 4:35:00 PM**
Dil. Factor:	**2.42**	**Date of Analysis:**	**11/2/15 08:18 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.3	Not Detected
Chlorobenzene	1.2	Not Detected	5.6	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Styrene	1.2	Not Detected	5.2	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.9	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.3	Not Detected
Propylbenzene	1.2	Not Detected	5.9	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.9	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.9	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.3	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.3	Not Detected
1,2,4-Trichlorobenzene	4.8	Not Detected	36	Not Detected
Hexachlorobutadiene	4.8	Not Detected	52	Not Detected
Naphthalene	2.4	0.058 J	13	0.30 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: B42SSV-1102815

Lab ID#: 1510593-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110218**	**Date of Collection:**	**10/28/15 1:39:00 PM**
Dil. Factor:	**2.28**	**Date of Analysis:**	**11/2/15 08:44 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.81 J	5.6	4.0 J
Freon 114	1.1	Not Detected	8.0	Not Detected
Chloromethane	11	Not Detected	24	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	11	Not Detected	44	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.1	0.56 J	6.4	3.1 J
Ethanol	4.6	14	8.6	27
Freon 113	1.1	Not Detected	8.7	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	24	27	56
2-Propanol	4.6	8.2	11	20
Carbon Disulfide	4.6	4.7	14	15
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	11	1.2 J	40	4.3 J
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	0.44 J	4.0	1.6 J
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	2.9 J	13	8.5 J
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	0.70 J	3.4	2.1 J
Chloroform	1.1	Not Detected	5.6	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.2	Not Detected
2,2,4-Trimethylpentane	1.1	0.24 J	5.3	1.1 J
Benzene	1.1	0.38 J	3.6	1.2 J
1,2-Dichloroethane	1.1	Not Detected	4.6	Not Detected
Heptane	1.1	0.82 J	4.7	3.4 J
Trichloroethene	1.1	0.42 J	6.1	2.3 J
1,2-Dichloropropane	1.1	Not Detected	5.3	Not Detected
1,4-Dioxane	4.6	0.93 J	16	3.3 J
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.1	0.49 J	4.7	2.0 J
Toluene	1.1	3.6	4.3	14
trans-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	Not Detected	7.7	Not Detected
2-Hexanone	4.6	0.55 J	19	2.2 J

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Client Sample ID: B42SSV-1102815

Lab ID#: 1510593-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110218**	**Date of Collection:**	**10/28/15 1:39:00 PM**
Dil. Factor:	**2.28**	**Date of Analysis:**	**11/2/15 08:44 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.7	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.8	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	1.3	4.9	5.5
m,p-Xylene	1.1	2.6	5.0	11
o-Xylene	1.1	0.80 J	5.0	3.4 J
Styrene	1.1	0.29 J	4.8	1.2 J
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	0.76 J	5.6	3.7 J
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	0.31 J	5.6	1.5 J
1,3-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.9	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.6	0.31 J	34	2.3 J
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected
Naphthalene	2.3	0.25 J	12	1.3 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	110	70-130
1,2-Dichloroethane-d4	113	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: B42SSV-2102815
Lab ID#: 1510593-07A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3110220	**Date of Collection: 10/28/15 3:42:00 PM**
Dil. Factor:	4.89	**Date of Analysis: 11/2/15 10:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.4	1.1 J	12	5.4 J
Freon 114	2.4	Not Detected	17	Not Detected
Chloromethane	24	Not Detected	50	Not Detected
Vinyl Chloride	2.4	Not Detected	6.2	Not Detected
1,3-Butadiene	2.4	Not Detected	5.4	Not Detected
Bromomethane	24	Not Detected	95	Not Detected
Chloroethane	9.8	Not Detected	26	Not Detected
Freon 11	2.4	0.57 J	14	3.2 J
Ethanol	9.8	160	18	300
Freon 113	2.4	Not Detected	19	Not Detected
1,1-Dichloroethene	2.4	Not Detected	9.7	Not Detected
Acetone	24	280	58	670
2-Propanol	9.8	46	24	110
Carbon Disulfide	9.8	0.88 J	30	2.7 J
3-Chloropropene	9.8	Not Detected	31	Not Detected
Methylene Chloride	24	Not Detected	85	Not Detected
Methyl tert-butyl ether	2.4	Not Detected	8.8	Not Detected
trans-1,2-Dichloroethene	2.4	Not Detected	9.7	Not Detected
Hexane	2.4	1.1 J	8.6	4.0 J
1,1-Dichloroethane	2.4	Not Detected	9.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	9.8	40	29	120
cis-1,2-Dichloroethene	2.4	Not Detected	9.7	Not Detected
Tetrahydrofuran	2.4	2.4	7.2	7.2
Chloroform	2.4	Not Detected	12	Not Detected
1,1,1-Trichloroethane	2.4	Not Detected	13	Not Detected
Cyclohexane	2.4	Not Detected	8.4	Not Detected
Carbon Tetrachloride	2.4	Not Detected	15	Not Detected
2,2,4-Trimethylpentane	2.4	Not Detected	11	Not Detected
Benzene	2.4	3.6	7.8	11
1,2-Dichloroethane	2.4	Not Detected	9.9	Not Detected
Heptane	2.4	2.4 J	10	9.8 J
Trichloroethene	2.4	1.3 J	13	6.9 J
1,2-Dichloropropane	2.4	Not Detected	11	Not Detected
1,4-Dioxane	9.8	Not Detected	35	Not Detected
Bromodichloromethane	2.4	Not Detected	16	Not Detected
cis-1,3-Dichloropropene	2.4	Not Detected	11	Not Detected
4-Methyl-2-pentanone	2.4	2.8	10	12
Toluene	2.4	2.0 J	9.2	7.5 J
trans-1,3-Dichloropropene	2.4	Not Detected	11	Not Detected
1,1,2-Trichloroethane	2.4	Not Detected	13	Not Detected
Tetrachloroethene	2.4	Not Detected	16	Not Detected
2-Hexanone	9.8	15	40	60

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Client Sample ID: B42SSV-2102815

Lab ID#: 1510593-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110220**	**Date of Collection:**	**10/28/15 3:42:00 PM**
Dil. Factor:	**4.89**	**Date of Analysis:**	**11/2/15 10:06 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	2.4	Not Detected	21	Not Detected
1,2-Dibromoethane (EDB)	2.4	Not Detected	19	Not Detected
Chlorobenzene	2.4	Not Detected	11	Not Detected
Ethyl Benzene	2.4	Not Detected	11	Not Detected
m,p-Xylene	2.4	1.0 J	11	4.4 J
o-Xylene	2.4	Not Detected	11	Not Detected
Styrene	2.4	Not Detected	10	Not Detected
Bromoform	2.4	Not Detected	25	Not Detected
Cumene	2.4	Not Detected	12	Not Detected
1,1,2,2-Tetrachloroethane	2.4	Not Detected	17	Not Detected
Propylbenzene	2.4	Not Detected	12	Not Detected
4-Ethyltoluene	2.4	Not Detected	12	Not Detected
1,3,5-Trimethylbenzene	2.4	Not Detected	12	Not Detected
1,2,4-Trimethylbenzene	2.4	Not Detected	12	Not Detected
1,3-Dichlorobenzene	2.4	Not Detected	15	Not Detected
1,4-Dichlorobenzene	2.4	Not Detected	15	Not Detected
alpha-Chlorotoluene	2.4	Not Detected	13	Not Detected
1,2-Dichlorobenzene	2.4	Not Detected	15	Not Detected
1,2,4-Trichlorobenzene	9.8	Not Detected	72	Not Detected
Hexachlorobutadiene	9.8	Not Detected	100	Not Detected
Naphthalene	4.9	0.091 J	26	0.48 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	108	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: B42SSV-3102815

Lab ID#: 1510593-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110221**	**Date of Collection:**	**10/28/15 1:16:00 PM**
Dil. Factor:	**2.28**	**Date of Analysis:**	**11/2/15 10:32 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.77 J	5.6	3.8 J
Freon 114	1.1	Not Detected	8.0	Not Detected
Chloromethane	11	Not Detected	24	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	11	Not Detected	44	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.1	0.60 J	6.4	3.4 J
Ethanol	4.6	80	8.6	150
Freon 113	1.1	0.16 J	8.7	1.2 J
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	47	27	110
2-Propanol	4.6	11	11	28
Carbon Disulfide	4.6	5.6	14	18
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	11	1.2 J	40	4.4 J
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	0.64 J	4.0	2.2 J
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	11	13	32
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	1.3	3.4	3.9
Chloroform	1.1	Not Detected	5.6	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.2	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.3	Not Detected
Benzene	1.1	0.44 J	3.6	1.4 J
1,2-Dichloroethane	1.1	Not Detected	4.6	Not Detected
Heptane	1.1	0.58 J	4.7	2.4 J
Trichloroethene	1.1	Not Detected	6.1	Not Detected
1,2-Dichloropropane	1.1	Not Detected	5.3	Not Detected
1,4-Dioxane	4.6	3.4 J	16	12 J
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.1	1.1 J	4.7	4.5 J
Toluene	1.1	1.2	4.3	4.4
trans-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	Not Detected	7.7	Not Detected
2-Hexanone	4.6	3.6 J	19	15 J

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Client Sample ID: B42SSV-3102815

Lab ID#: 1510593-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3110221**	**Date of Collection:**	**10/28/15 1:16:00 PM**
Dil. Factor:	**2.28**	**Date of Analysis:**	**11/2/15 10:32 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.7	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.8	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	0.35 J	4.9	1.5 J
m,p-Xylene	1.1	0.93 J	5.0	4.0 J
o-Xylene	1.1	Not Detected	5.0	Not Detected
Styrene	1.1	0.86 J	4.8	3.7 J
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	0.32 J	5.6	1.6 J
1,3-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,4-Dichlorobenzene	1.1	0.38 J	6.8	2.3 J
alpha-Chlorotoluene	1.1	Not Detected	5.9	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected
Naphthalene	2.3	0.069 J	12	0.36 J

J = Estimated value.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	112	70-130
1,2-Dichloroethane-d4	121	70-130
4-Bromofluorobenzene	94	70-130

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Terry Taylor
Collected by: (Print and Sign) David Lindstrand
Company AMAI Email
Address 2700 Westchester City Purchase State NY Zip 10577
Phone 914-251-1400 Fax

Project Info:
P.O. #
Project #
Project Name BMS V1

Turn Around Time:
☐ Normal
☒ Rush
3-Day
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial (in Hg)	Final (in Hg)	Receipt	Final (psi)
01A	B30SSV-1 10 27 15	34158	10/27/15	18:01	TO-15	-30	-5		
02A	B30 SSV-2 10 27 15	IL2742	10/27/15	15:53	TO-15	-30	-5		
03A	B30 SSV-3 10 28 15	IL1808	10/28/15	12:31	TO-15	-30	-5		
04A	B30SSV-4 10 27 15	37686	10/27/15	16:36	TO-15	-30	-5		
05A	B30 SSV-4D 10 27 15	33718	10/27/15	16:35	TO-15	-30	-5		
	~~B30 SSV-5~~ DNA								
06A	B42SSV-1 10 28 15	37317	10/28/15	13:39	TO-15	-30	-5		
07A	B42SSV-2 102815	35613	10/28/15	15:42	TO-15	-30	-7		
08A	B42 SSV-3 10 28 15	35646	10/28/15	13:16	TO-15	-29	-5		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	10/29/15 13:00		10/30/15
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
Shipped via DHL by D. Lindstrand

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fedex		N/A	Good	Yes No None	1510593

Form 1293 rev.11

DATA REVIEW WORKSHEETS

Project Number:__1510593_____
Date:_____10/27-28/2015_____

REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: QC criteria from "Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999"; USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.
The hardcopied (laboratory name) _Eurofins_-_Air_Toxics_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: __1510593_____ Sample matrix: ___Air_____
No. of Samples: _____8_____

Trip blank No.: ____-_____
Field blank No.: _____-_____
Equipment blank No.:___-_____
Field duplicate No.:_____1510593-04A/1510593-05A_____

___X___ Data Completeness
___X___ Holding Times
___X___ GC/MS Tuning
___X___ Internal Standard Performance
___X___ Blanks
___X___ Surrogate Recoveries
___N/A_ Matrix Spike/Matrix Spike Duplicate
___X___ Laboratory Control Spikes
___X___ Field Duplicates
___X___ Calibrations
___X___ Compound Identifications
___X___ Compound Quantitation
___X___ Quantitation Limits

Overall Comments:_VOCs_by_method_TO-15_____
_____

Definition of Qualifiers:
J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Infante
Date:__ 11/14/2015_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

All criteria were met __X__
Criteria were not met
and/or see below ____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): N/A – summa canisters

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

All criteria were met __X___
Criteria were not met see below _____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X___ The BFB performance results were reviewed and found to be within the specified criteria.

__X___ BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:
_____

If mass calibration is in error, all associated data are rejected.

All criteria were met ___X___
Criteria were not met
and/or see below _____

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____09/03/15_____
Dates of continuing calibration:__11/2-3/15_____
Instrument ID numbers:____MSD-14_____
Matrix/Level:_____Air/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration met the method performance criteria.				

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.
All %RSD must be $\leq$ 15 % regardless of method requirements for CCC.
All %Ds must be $\leq$ 30% regardless of method requirements for CCC.
Method TO-15 does not specify criterion for the curve correlation coefficient (r). A limit for r of $\geq$ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05, estimate positive results (J) and reject nondetects (R), regardless of method requirements.
If any compound has a %RSD > 15%, estimate positive results (J) and use professional judgment to qualify nondetects.
If any compound has a %RSD > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and nondetects (UJ).
If any compound has a % D > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has r < 0.995, estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

All criteria were met _____
Criteria were not met
and/or see below ___X___

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
All_method/laboratory_blank_meeth_method_specific_criteria_except_for_the_followings:				
11/03/15	1510593-09A	Air/low	Acetone	0.82 ppbv
			CS_2	0.43 ppbv
			4-methyl-2-pentanone	0.15 ppbv
			1,3,5-trimethylbenzene	0.19 ppbv
			1,2,4-trichlorobenzene	0.084 ppbv

Note: no action taken; analyte concentrations below the action level for blanks.

Summa_canisters_met_cleaning_certification_criteria

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No_field/trip/equipment_blanks_analyzed_with_this_data_package.				

All criteria were met ____
Criteria were not met
and/or see below _X_

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and ≤ AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but ≤ AL, report the compound as not detected (U) at the reported concentration.
If the concentration is ≥ SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

All criteria were met __X__
Criteria were not met
and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND			ACTION
	1,2-DICHLOROETHANE-d4	Toluene-d8	4-BFB	

_Surrogate_recoveries_within_laboratory_control_limits_____
_____
_____
_____
_____
_____

QC Limits* (Air)

_____LL_to_UL___70__to_130__ _70__to_130_ _70__to_130__

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

All criteria were met _____
Criteria were not met
and/or see below __N/A___

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.
Sample ID:_____ Matrix/Level:_____

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
MS/MSD are not required as part of Method TO-15; blank spike used to assess accuracy					

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met _____
Criteria were not met
and/or see below __N/A___

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Method TO-15 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID:_____ Matrix/Level/Unit:_____

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).
* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

All criteria were met _____
Criteria were not met
and/or see below __X___

VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? Yes or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT
___LCS/LCSD_%_recoveries_and_RPD_within_laboratory_control_limits_except_the_followings:_			
_____1510593-11B_____	Naphthalene_____	50_%_____	60_-_140__
_____1510593-11BB_____	Naphthalene_____	58_%_____	60_-_140__
_____1510593-11BB_____	Methy-tert-butyl-ether_____	69_%_____	70_-_130__

Note: no action taken; professional judgment.

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? **Yes** or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

All criteria were met __X___
Criteria were not met
and/or see below _____

IX. LABORATORY DUPLICATE PRECISION

Sample IDs: __LCS/LCSD_____ Matrix:___Air____

Laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within laboratory and generally acceptable control limits.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met _____
Criteria were not met
and/or see below __X____

IX. FIELD DUPLICATE PRECISION

Sample IDs: _1510593-04A/1510593-05A_ Matrix:___Air____

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Ethanol	4.8	99	35	96 %	Qualify results (J) in affected samples.
2-propanol	4.8	21	120	140 %	Qualify results (J) in affected samples.

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met __X__
Criteria were not met
and/or see below _____

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

* Area of +40% or -40% of the IS area in the associated calibration standard.
* Retention time (RT) within ± 0.06 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

_Internal_standard_area_and_retention_times_within_laboratory_control_limits_for_both_samples_and_calibration_standards_____

Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -40%		IS AREA > + 40%
Positive results	J		J
Nondetected results	R		ACCEPT

2. If a IS retention time varies more than 0.330 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

All criteria were met __X__
Criteria were not met
and/or see below ____

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1510593-01A

Ethylbenzene RF = 0.72902

[ ] = (93119)(400)/(184666)(0.72902)

= 276.7 ppbv OK

All criteria were met _X_
Criteria were not met
and/or see below _____

XII. QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASONS FOR DILUTION
1510593-01A	233	Analyte concentration above calibration curve.
1510593-02A	9.16	Analyte concentration above calibration curve.
All other samples were diluted by a factor of < 5x.		

B. Percent Solids

List samples which have ≤ 50 % solids

Actions:

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)